UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTION

MEMORANDUM:

To: Vanessa Emerson, Physical Scientist

From: Helen Hull-Sanders, Ph.D., Entomologist

Secondary Review: Jennifer Saunders, Ph.D., Senior Biologist

Date: 4/29/2019

Subject: PRODUCT PERFORMANCE DATA EVALUATION RECORD (DER)

THIS DER DOES NOT CONTAIN CONFIDENTIAL BUSINESS INFORMATION

Note: MRIDs found to be **unacceptable** to support label claims should be removed from the data matrix.

DP barcode: 451108
Decision no.: 548393
Submission no: 1030891
Action code: R310
Product Name: ULTRA MAX GEL
EPA Reg. No or File Symbol: 88613-R
Formulation Type: gel bait
Ingredients statement from the label with PC codes included:

Fipronil	0.05%	PC:	129121

Application rate(s) of product and each active ingredient (lbs. or gallons/1000 square feet or per acre as appropriate; and g/m^2 or mg/cm^2 or mg/kg body weight as appropriate):

1 – 2 g product/yd^2 (1- 2 g product/8361.27 cm^2 ~ 50 – 100 mg AI/8361.27 cm^2)

Small Cockroaches: 0.75 g product/yd^2 to 3 g product/yd^2

Large Cockroaches: 1-2 g product/yd^2

Use Patterns: Use as a spot or crack and crevice treatment for indoors and outdoors (adjacent to homes & structures). Use in residential areas and the non-food/non-feed areas of institutional, warehousing and commercial establishments, including warehouses, restaurants, food processing plants, supermarkets, hospitals, nursing homes, motels, hotels, apartment buildings, bakeries, beverage plants, breweries, bottling facilities,-candy plants, canneries, cereal processing and manufacturing plants, dairies and dairy product processing plants, frozen food plants, schools, laboratories, computer facilities, sewers, aircraft, buses, boats/ships, trains, homes, houses, industrial buildings, office buildings, kennels, kitchens, manufacturing facilities, spice plants, stores, wineries and similar structures, mausoleums, meat processing and packaging plants, meat and vegetable canneries, pet shops, and zoos; non-food/non-feed areas including bedrooms, living rooms, bathrooms, closets, media rooms, garbage rooms, lavatories, entries, and vestibules, offices, locker rooms, machine rooms, boiler rooms, garages, mop closets, and storage (after canning or bottling); and in food/feed areas of food/feed handling establishments.

I. Action Requested: MRID 50792111 is reviewed here to determine if efficacy claims against cockroaches (German, American, brown banded, Oriental, smoky-brown) of public health significance are supported.

II. Background: Registrant submitted a single study to support claims against German, American, Oriental, brown banded, and smoky-brown cockroaches.

III. MRID Summary:

MRID 50792111: Control Effects of Fipronil 0.05% Gel Against Adult Germany Cockroach (*Blattella germanica*)

(1) GLP

(2) **Methods**: Three sets of experiments were performed.

1. Twenty German cockroaches (*Blattella germanica*) were placed in a "medium" plastic box (150 cm X 150 cm X 50 cm). Two grams of Fipronil 0.05% gel bait (product specificity not indicated) were added to the box (~2 g/ 22,500 cm^2 box floor surface area). Water was provided in a vial next to the bait.

2. Twenty German cockroaches were placed in a "medium" plastic box (150 cm X 150 cm X 50 cm). One gram of Fipronil 0.05% gel bait (product specificity not indicated) was added to the box (~1 g/ 22,500 cm^2 box floor surface area). Water was provided in a vial next to the bait.

3. Twenty German cockroaches were placed in a "small" plastic box (100 cm X 100 cm X 50 cm). Two grams of Fipronil 0.05% gel bait (product specificity not indicated) were added to the box (~2 g/ 10,000 cm^2 box floor surface area). Water was provided in a vial next to the bait.

For controls, 20 German cockroaches were placed in a "medium" plastic box (150 cm X 150 cm X 50 cm). Two grams of bait ingredients without the active ingredient were used as food. Each set of experiments was replicated three times and boxes were held in an incubator at 25 ± 5º C and 65 ± 5% humidity. Mortality was assessed at 1 and 7 d post-treatment.

(3) **Results:** German cockroach mortality was < 90% 7 days after bait exposure and control mortality was 0%. When exposed to 2 g of gel bait, mortality was 87% in medium boxes and 88% in small boxes. When exposed to 1 g of gel bait, mortality was 72% in medium boxes.

(4) **Conclusions: Unacceptable.** Data do not support German cockroach claims. The gel bait used was not shown to have ≥90% mortality. In addition, the product tested was not identified. Bait testing should be product specific. A minimum of 5 replicates should be used for each treatment group, and the study method should be balanced to include a minimum of 5 untreated control replicates. Testing arenas should be large enough for the cockroaches to move and a harborage should be available to sufficiently cover all cockroaches together in the arena. An alternate food source and water should be available.

IV. EXECUTIVE DATA SUMMARY:

Laboratory only data were submitted for German cockroaches. No data were submitted for American cockroaches to support a general cockroach claim or a specific American cockroach claim. No data were submitted to support specific Brown-banded, Smokey-brown or Oriental cockroach claims. No data were submitted to support controls (residual) or outdoor claims. It is unclear if the product tested is the same as the proposed product, as it was not identified in the study provided. References are made for use in refillable stations; product should be tested in intended bait stations. The product tested did not show ≥ 90% efficacy for the duration of the test. Even if an acceptable level of efficacy was reached, testing was a no choice test and would not have supported German cockroach claims.

V. LABEL RECOMMENDATIONS:

(1) Make the following changes in the Directions for Use:

Remove all references to cockroaches, including German, American, Oriental, brown banded, and smoky-brown cockroaches

(2) The following marketing claims are acceptable:

Any non-public health arthropod claims

(3) The following marketing claims are unacceptable:

Controls cockroaches

Controls American, German and Oriental cockroaches

All efficacy related claims on page 9

(4) The following MRIDs should be removed from the data matrix, as they are classified as “unacceptable” to support the product:

MRID 50792111

EFFICACY STUDY DATA EVALUATION RECORD (COMPLETED STUDY) - Registration

Primary Reviewer's Name/Title: Chris Peterson, Toxicologist

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP GUIDELINE NO. 810.3500]
MRID:	50647908. Laboratory bioassay to determine the efficacy of bait products against American and German cockroaches, in terms of mortality, J. Hostetler, 2018.
DP BARCODE NO:	Not provided
DECISION NO:	543480
CONFIDENTIALITY CLAIMS:	Information claimed confidential on the basis of falling within the scope of FIFRA Section 10(d)(1) (A), (B), or (C) has been removed to a confidential attachment and is cited by cross-reference number in the body of the study.
GOOD LABORATORY PRACTICE:	This study was not conducted under Good Laboratory Practice (GLP) standards as outlined in the Federal Register, Part IV, Environmental Protection Agency 40 CFR, Part 160, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule August 17, 1989.
SUBJECT PRODUCT:	PRODUCT NAME: CSI 16-202 Roach Gel EPA REGISTRATION NUMBER OR FILE SYMBOL: 53883-ULA FORMULATION TYPE: Gel bait ACTIVE INGREDIENT NAME: Fipronil 0.05% [PC CODE: 122804] Abamectin 0.05% [PC CODE: 129121] PRODUCT APPLICATION RATE(S) AS LABELED AND AS APPLICABLE TO THIS MRID: Commercial use: Small cockroaches: 0.75 to 3 g bait square yard, depending on level of infestation. Large cockroaches: 1 to 2 g of bait per square yard. Consumer use: 0.5 to 1.5 g bait per square yard. ACTIVE INGREDIENT APPLICATION RATE(S): Commercial use: Small cockroaches: 0.38 to 1.5 mg/square yard fipronil + 0.38 to 1.5 mg/square yard abamectin, depending on level of infestation. Large cockroaches: 0.5 to 1.0 mg/square yard fipronil + 0.5 to 1.0 mg/square yard abamectin. Consumer use: 0.25 to 0.75 mg/square yard fipronil + 0.25 to 0.75 mg/square yard abamectin.

Efficacy Study Data Evaluation Record

Purpose of study

The purpose of the study was to determine the efficacy of gel bait products against cockroaches.

Materials and Methods

This study was conducted in Baltimore, Maryland on American (*Periplaneta americana*) and German (*Blattella germanica*) cockroaches obtained from colonies maintained at i2L Research USA, Inc., in Baltimore, Maryland. The author does not note the pesticide susceptibility status of the colonies. For each species, five replicates of 10 adult 50:50 mixed-sex (females without ootheca) insects were placed into 58 by 41 by 23 cm lidded containers provided with rat chow and a 10-cm tube of water plugged with a cotton ball and a 10 by 4 cm ID cardboard tube harborage. The baits were placed on the opposite side of the container from the harborage 24 hr after introduction of the cockroaches, at the amounts and active ingredient doses indicated in Table 1. One control group of five replicates of 10 insects was used for each species, and was handled in an identical manner as the treatment groups except no bait was introduced.

Table 1.

American Cockroach		
AI/Product Name	**Gram applied**	**Active ingredient dose**
0.05% Fipronil	3.67	1.84 mg fipronil
0.05% Abamectin	3.68	1.84 mg abamectin
0.5% Chlorfenapyr	3.77	1.88 mg chlorfenapyr
0.05% Fipronil + 0.05% abamectin*	3.74	1.87 mg fipronil + 1.87 mg abamectin
0.05% Fipronil + 0.5% chlorfenapyr	3.76	1.88 mg fipronil + 18.88 mg chlorfenapyr
0.05% Fipronil Bayer Maxforce FC Magnum	3.73	1.87 mg fipronil
Advion Cockroach Gel Bait	3.74	Active ingredient identity and concentration not identified
CSI Indoxacarb TekkoPro Cockroach Gel Bait	3.59	Active ingredient concentration not identified
German cockroach		
AI/Product Name	**Gram applied**	**Active ingredient dose**
0.05% Fipronil	3.80	1.90 mg fipronil
0.05% Abamectin	3.77	1.89 mg abamectin
0.5% Chlorfenapyr	3.73	0.186 g chlorfenapyr
0.05% Fipronil + 0.05% abamectin*	3.76	1.88 mg fipronil + 1.99 mg abamectin
0.05% Fipronil + 0.5% chlorfenapyr	3.77	1.89 mg fipronil + 18.85 mg chlorfenapyr
0.05% Fipronil Bayer Maxforce FC Magnum	3.71	1.86 mg fipronil
Advion Cockroach Gel Bait	3.70	Active ingredient identity and concentration not identified
CSI Indoxacarb TekkoPro Cockroach Gel Bait	3.64	Active ingredient concentration not identified

*Product under evaluation in this MRID

Mortality (dead cockroaches, those not displaying any movement when probed), the number of alive cockroaches (those running and hiding when agitated), and the presence of moribund cockroaches (displaying uncoordinated movements, twitching, or being unable to right selves in response to stimuli) were determined at 1, 3, 5, 7, 10, 14, and 21 days post treatment or until mortality reached 100%. Dead cockroaches were removed when observed, and the test proceeded at 26.3 ± 0.6 ºC and 55.3 ± 0.3% relative humidity. Mortality in the results is based only on cockroaches counted as "dead," and corrections for control mortality were made by using Abbott's Formula. Statistical analysis

was conducted by using the Kruskal-Wallis or Student *t*-tests depending on data normality. However, the author does not report any statistical analyses of results other than standard errors.

Results

Exposure of American and German cockroaches to the treated baits caused ≥90% mortality within the number of days indicated in Table 2. The summary table is derived directly from the raw data provided. Control mortality for German cockroaches surpassed 10% within 21 days.

Table 2.

American Cockroach			
AI/Product Name	**Gram applied**	**Active ingredient dose**	**Days to ≥90% mortality**
0.05% Fipronil	3.67	0.184 g fipronil	7
0.05% Abamectin	3.68	0.184 g abamectin	14
0.5% Chlorfenapyr	3.77	0.188 g chlorfenapyr	10
0.05% Fipronil + 0.05% abamectin*	3.74	0.187 g fipronil + 0.187 g abamectin	10
0.05% Fipronil + 0.5% chlorfenapyr	3.76	0.188 g fipronil + 0.188 g chlorfenapyr	10
0.05% Fipronil Bayer Maxforce FC Magnum	3.73	0.187 g fipronil	7
Advion Cockroach Gel Bait	3.74	Active ingredient identity and concentration not identified	14
CSI Indoxacarb TekkoPro Cockroach Gel Bait	3.59	Active ingredient concentration not identified	14
German cockroach			
AI/Product Name	**Gram applied**	**Active ingredient dose**	**Days to ≥90% mortality**
0.05% Fipronil	3.80	0.190 g fipronil	14
0.05% Abamectin	3.77	0.189 g abamectin	10
0.5% Chlorfenapyr	3.73	0.186 g chlorfenapyr	21
0.05% Fipronil + 0.05% abamectin*	3.76	0.188 g fipronil + 0.188 g abamectin	14
0.05% Fipronil + 0.5% chlorfenapyr	3.77	0.189 g fipronil + 0.189 g chlorfenapyr	7
0.05% Fipronil Bayer Maxforce FC Magnum	3.71	0.186 g fipronil	10
Advion Cockroach Gel Bait	3.70	Active ingredient identity and concentration not identified	21
CSI Indoxacarb TekkoPro Cockroach Gel Bait	3.64	Active ingredient concentration not identified	14

*Product under evaluation in this MRID

The author notes one deviation from the study protocol in that the facility location was moved from that indicated in the protocol.

Conclusions

Exposure of American and German cockroaches to the treated baits caused ≥90% mortality within the number of days indicated in Table 2.

EFFICACY STUDY DATA EVALUATION RECORD (COMPLETED STUDY) - Registration

Primary Reviewer's Name/Title: Chris Peterson, Toxicologist

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP GUIDELINE NO. 810.3500]
MRID:	50647909. Determination of the efficacy of several Control Solutions Inc. (CSI) cockroach baits on Turkestan cockroaches (*Blatta lateralis*), P. Shults, E. Vargo, 2018.
DP BARCODE NO:	Not provided
DECISION NO:	543480
CONFIDENTIALITY CLAIMS:	Information claimed confidential on the basis of falling within the scope of FIFRA Section 10(d)(1) (A), (B), or (C) has been removed to a confidential attachment and is cited by cross-reference number in the body of the study.
GOOD LABORATORY PRACTICE:	This study was not conducted under Good Laboratory Practice (GLP) standards as outlined in the Federal Register, Part IV, Environmental Protection Agency 40 CFR, Part 160, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule August 17, 1989.
SUBJECT PRODUCT:	PRODUCT NAME: CSI 16-202 Roach Gel EPA REGISTRATION NUMBER OR FILE SYMBOL: 53883-ULA FORMULATION TYPE: Gel bait ACTIVE INGREDIENT NAME: Fipronil 0.05% [PC CODE: 122804] Abamectin 0.05% [PC CODE: 129121] PRODUCT APPLICATION RATE(S) AS LABELED AND AS APPLICABLE TO THIS MRID: Commercial use: Small cockroaches: 0.75 to 3 g bait square yard, depending on level of infestation. Large cockroaches: 1 to 2 g of bait per square yard. Consumer use: 0.5 to 1.5 g bait per square yard. ACTIVE INGREDIENT APPLICATION RATE(S): Commercial use: Small cockroaches: 0.38 to 1.5 mg/square yard fipronil + 0.38 to 1.5 mg/square yard abamectin, depending on level of infestation. Large cockroaches: 0.5 to 1.0 mg/square yard fipronil + 0.5 to 1.0 mg/square yard abamectin. Consumer use: 0.25 to 0.75 mg/square yard fipronil + 0.25 to 0.75 mg/square yard abamectin.

Efficacy Study Data Evaluation Record

Purpose of study

The purpose of the study was to evaluate the efficacy of cockroach gel baits against Turkestan cockroaches.

Materials and Methods

This study was conducted in College Station, Texas on ten adult or late instar specimens per replication (the number of replications was not reported) from a laboratory colony of Turkestan cockroaches (*Blatta lateralis*), the pesticide susceptibility status of which was not reported. One day prior to test initiation, the cockroaches were placed into 29 by 15 cm plastic boxes provided with a harborage (not described), food and water. At test initiation, 2.0 g of bait and 2.0 g of dog food laboratory diet were introduced into the test arenas in separate weigh boats. The baits tested included Advion Evolution (0.60% indoxacarb at an a.i. dose of 12.0 mg indoxacarb), Maxforce FC (0.01% fipronil at an a.i. dose of 0.2 mg fipronil), CSI bait NP (0.10% novaluron + 0.10% pyriproxyfen at an a.i. dose of 2.0 mg novaluron + 2.0 mg pyriproxyfen), CSI bait ABF (0.05% abamectin + 0.05% fipronil at an a.i. dose of 1.0 mg abamectin + 1.0 mg fipronil (corresponding to the product evaluated in this MRID), CSI bait INP (0.60% indoxacarb + 0.10% novaluron + 0.10% pyriproxyfen at an a.i. dose of 12 mg indoxacarb + 2.0 mg novaluron + 2.0 mg pyriproxyfen), or untreated control. Mortality (criteria not defined, therefore it is unknown if mortality was considered separately from morbidity) was recorded daily from 1 to 7 days, and then at 13 days. The environmental conditions during testing were not reported. The data were statistically analyzed by using analysis of variance (ANOVA) at $P \leq 0.05$ and survival analysis was conducted by using Kaplan-Meier survival analyses.

Results

Turkestan cockroaches fed CSI bait ABF (0.05% abamectin + 0.05% fipronil at an a.i. dose of 1.0 mg abamectin + 1.0 mg fipronil (corresponding to the product evaluated in this MRID) experienced ≥90% mortality within 2 days, while those fed CSI bait INP (0.60% indoxacarb + 0.10% novaluron + 0.10% pyriproxyfen at an a.i. dose of 12 mg indoxacarb + 2.0 mg novaluron + 2.0 mg pyriproxyfen) experienced ≥90% mortality within 6 days, and those fed Advion Evolution (0.60% indoxacarb at an a.i. dose of 12.0 mg indoxacarb) experienced ≥90% mortality within 13 days (Table 1 = Table 2 of MRID). Control mortality did not equal or surpass 10%. The authors did not provide raw data. No treatment experienced a reduction in consumption of ≥90%.

Table 1.

Table 2. Cumulative mean mortality of Turkestan cockroaches (*Blatta lateralis*) after treatments were introduced to the arenas. The abbreviations used to denote each treatment can be found in table 1. Numbers followed by different letters were significantly different (ANOVA with Tukey's, P ≤ 0.05).

Treatment	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 13
Evo	0.57 ^{cd}	4.29 ^{b}	6.14 ^{bc}	6.57 ^{bc}	7.14 ^{bc}	7.43 ^{b}	8.14 ^{b}	9.00 ^{ab}
Maxforce	2.57 ^{bc}	4.29 ^{b}	5.14 ^{c}	5.29 ^{c}	5.86 ^{c}	6.29 ^{b}	6.43 ^{c}	7.86 ^{b}
CSI NP	0.00 ^{d}	0.14 ^{c}	0.29 ^{d}	0.29 ^{d}	0.49 ^{d}	0.43 ^{c}	0.57 ^{d}	1.29 ^{c}
CSI ABF	8.29 ^{a}	9.00 ^{a}	9.43 ^{a}	9.57 ^{a}	10.00 ^{a}	10.00 ^{a}	10.00 ^{a}	10.00 ^{a}
CSI INP	3.14 ^{b}	5.14 ^{b}	7.86 ^{ab}	8.29 ^{ab}	8.86 ^{ab}	9.57 ^{a}	9.57 ^{ab}	9.71 ^{a}
Control	0.14 ^{d}	0.14 ^{c}	0.14 ^{d}	0.14 ^{d}	0.26 ^{d}	0.29 ^{c}	0.43 ^{d}	0.43 ^{c}

The authors do not report any deviations from or amendments to the protocol.

Conclusions

- Turkestan cockroaches fed CSI bait ABF (0.05% abamectin + 0.05% fipronil at an a.i. dose of 1.0 mg abamectin + 1.0 mg fipronil (corresponding to the product evaluated in this MRID) experienced ≥90% mortality within 2 days.

- Turkestan cockroaches fed CSI bait INP (0.60% indoxacarb + 0.10% novaluron + 0.10% pyriproxyfen at an a.i. dose of 12 mg indoxacarb + 2.0 mg novaluron + 2.0 mg pyriproxyfen) experienced ≥90% mortality within 6 days.
- Turkestan cockroaches fed Advion Evolution (0.60% indoxacarb at an a.i. dose of 12.0 mg indoxacarb) experienced ≥90% mortality within 13 days.

TASK 2 DATA EVALUATION RECORD

STUDY TYPE: Product Performance

MRID 50647910. Laboratory bioassay to determine the efficacy of bait products against Oriental cockroaches, in terms of mortality, J. Hostetler, 2018.

OCSPP Product Performance Guideline: 810.3500

Product Name: CSI 16-202 Roach Gel
EPA Reg. No. or File Symbol: 53883-ULA
Decision number: 543480
DP number: Not provided

Prepared for
Registration Division (7505)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Washington, DC 20460

Prepared by
Summitec Corporation
Task Order No.: Efficacy 1-32

Primary Reviewer: Chris Peterson, Ph.D.	Signature: Date:	Chris Peterson AE 11/27/2018
Secondary Reviewers: Gene Burgess, Ph.D.	Signature: Date:	Gene Burgess AE 11/27/2018
Robert H. Ross, M.S., Project Manager	Signature: Date:	Robert H. Ross AE 11/27/2018
Quality Assurance: Angela M. Edmonds, B.S.	Signature: Date:	Angela M. Edmonds 11/27/2018

Disclaimer

This review may have been altered subsequent to the contractor's signatures above.
Summitec Corp. for the U.S. Environmental Protection Agency under Contract No. EP-W-16-019

EFFICACY STUDY DATA EVALUATION RECORD (COMPLETED STUDY) - Registration

Primary Reviewer's Name/Title: Chris Peterson, Toxicologist

STUDY TYPE:	PRODUCT PERFORMANCE [OCSPP GUIDELINE NO. 810.3500]
MRID:	50647910. Laboratory bioassay to determine the efficacy of bait products against Oriental cockroaches, in terms of mortality, J. Hostetler, 2018.
DP BARCODE NO:	Not provided
DECISION NO:	543480
CONFIDENTIALITY CLAIMS:	Information claimed confidential on the basis of falling within the scope of FIFRA Section 10(d)(1) (A), (B), or (C) has been removed to a confidential attachment and is cited by cross-reference number in the body of the study.
GOOD LABORATORY PRACTICE:	This study was not conducted under Good Laboratory Practice (GLP) standards as outlined in the Federal Register, Part IV, Environmental Protection Agency 40 CFR, Part 160, Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); Good Laboratory Practice Standards; Final Rule August 17, 1989.
SUBJECT PRODUCT:	PRODUCT NAME: CSI 16-202 Roach Gel EPA REGISTRATION NUMBER OR FILE SYMBOL: 53883-ULA FORMULATION TYPE: Gel bait ACTIVE INGREDIENT NAME: Fipronil 0.05% [PC CODE: 122804] Abamectin 0.05% [PC CODE: 129121] PRODUCT APPLICATION RATE(S) AS LABELED AND AS APPLICABLE TO THIS MRID: Commercial use: Small cockroaches: 0.75 to 3 g bait square yard, depending on level of infestation. Large cockroaches: 1 to 2 g of bait per square yard. Consumer use: 0.5 to 1.5 g bait per square yard. ACTIVE INGREDIENT APPLICATION RATE(S): Commercial use: Small cockroaches: 0.38 to 1.5 mg/square yard fipronil + 0.38 to 1.5 mg/square yard abamectin, depending on level of infestation. Large cockroaches: 0.5 to 1.0 mg/square yard fipronil + 0.5 to 1.0 mg/square yard abamectin. Consumer use: 0.25 to 0.75 mg/square yard fipronil + 0.25 to 0.75 mg/square yard abamectin.

Efficacy Study Data Evaluation Record

Purpose of study

The purpose of the study was to determine the efficacy of gel bait products against Oriental cockroaches.

Materials and Methods

This study was conducted in Baltimore, Maryland on Oriental (*Blatta orientalis*) cockroaches obtained from colonies maintained at i2L Research USA, Inc., in Baltimore, Maryland. The author does not note the pesticide susceptibility status of the colonies. Five replicates of 12 adult 50:50 mixed-sex (females without ootheca) insects were placed into 58 by 41 by 23 cm lidded containers provided with rat chow and a 10-cm tube of water plugged with a cotton ball and a 10 by 4 cm ID cardboard tube harborage. The baits were placed on the opposite side of the container from the harborage 24 hr after introduction of the cockroaches, at the amounts and active ingredient doses indicated in Table 1. One control group of five replicates of 12 insects was used, and was handled in an identical manner as the treatment groups except no bait was introduced.

Table 1.

American Cockroach		
AI/Product Name	**Gram applied**	**Active ingredient dose**
0.05% Fipronil	3.89	1.95 mg fipronil
0.05% Abamectin	3.77	1.89 mg abamectin
0.5% Chlorfenapyr	3.86	19.30 mg chlorfenapyr
0.05% Fipronil + 0.05% abamectin*	3.83	1.92 mg fipronil + 1.92 mg abamectin
0.05% Fipronil + 0.5% chlorfenapyr	3.87	1.94 mg fipronil + 19.35 mg chlorfenapyr
0.05% Fipronil Bayer Maxforce FC Magnum	3.81	1.91 mg fipronil
0.6% Indoxacarb Advion Cockroach Gel Bait	3.88	23.28 mg indoxacarb
0.6% Indoxacarb + 0.1% Novaluron + 0.1% Pyriproxyfen CSI Indoxacarb TekkoPro Cockroach Gel Bait	3.91	23.46 mg indoxacarb + 3.91 mg novaluron + 3.91 mg pyriproxyfen

*Product under evaluation in this MRID

Mortality (dead cockroaches, those not displaying any movement when probed), the number of alive cockroaches (those running and hiding when agitated), and the presence of moribund cockroaches (displaying uncoordinated movements, twitching, or being unable to right selves in response to stimuli) were determined at 1, 3, 5, 7, 10, 14, and 21 days post treatment or until mortality reached 100%. Dead cockroaches were removed when observed, and the test proceeded at 24.8 ± 0.3 ºC and 54.4 ± 3.3% relative humidity. Mortality in the results is based only on cockroaches counted as "dead," and corrections for control mortality were made by using Abbott's Formula. Standard errors were calculated but the data were not otherwise analyzed.

Results

Exposure of Oriental cockroaches to the treated baits caused ≥90% mortality within the number of days indicated in Table 2. The summary table is derived directly from the raw data provided. Control mortality did not surpass 10% within 21 days.

Table 2.

American Cockroach			
AI/Product Name	**Gram applied**	**Active ingredient dose**	**Days to ≥90% mortality**
0.05% Fipronil	3.89	1.95 mg fipronil	7
0.05% Abamectin	3.77	1.89 mg abamectin	NO
0.5% Chlorfenapyr	3.86	19.30 mg chlorfenapyr	NO
0.05% Fipronil + 0.05% abamectin*	3.83	1.92 mg fipronil + 1.92 mg abamectin	7

0.05% Fipronil + 0.5% chlorfenapyr	3.87	1.94 mg fipronil + 19.35 mg chlorfenapyr	10
0.05% Fipronil Bayer Maxforce FC Magnum	3.81	1.91 mg fipronil	5
0.6% Indoxacarb Advion Cockroach Gel Bait	3.88	23.28 mg indoxacarb	14
0.6% Indoxacarb + 0.1% Novaluron + 0.1% Pyriproxyfen CSI Indoxacarb TekkoPro Cockroach Gel Bait	3.91	23.46 mg indoxacarb + 3.91 mg novaluron + 3.91 mg pyriproxyfen	14

*Product under evaluation in this MRID
NO = Not observed

The author notes one amendment to the protocol, which corrects an error in the protocol in the name of one of the test products.

Conclusions

Exposure of Oriental cockroaches to the treated baits caused ≥90% mortality within the number of days indicated in Table 2.